Claim Amendments

1. (currently amended) An apparatus, comprising:

a polymeric potting material that encapsulates a fiber optic sensing coil, wherein the fiber optic sensing coil comprises a first coil portion and a second coil portion, wherein the first coil portion is adjacent to the second coil portion, wherein the polymeric potting material comprises a plurality of introduced voids that promote an increase in compressibility of the polymeric potting material, wherein one or more of the plurality of introduced voids are located between the first coil portion and the second coil portion;

wherein upon an introduction of an applied force to a portion of the polymeric potting material, one or more of the one or more of the plurality of introduced voids compress to allow the portion of the polymeric potting material to absorb a portion of the applied force and promote a decrease of a reaction force from the portion of the polymeric potting material to the fiber optic sensing coil.

2. (currently amended) The apparatus of claim 1, wherein the compression of the one or more of the one or more of the plurality of introduced voids promotes a decrease in strain of the fiber optic sensing coil due to contact with the polymeric potting material.

3. (previously presented) The apparatus of claim 1, wherein the plurality of introduced voids in the polymeric potting material promote a decrease in a bulk modulus of the polymeric potting material.

4. (previously presented) The apparatus of claim 1, wherein upon a change in temperature, the plurality of introduced voids in the polymeric potting material promote a decrease in a thermal pressure induced on the fiber optic sensing coil by the polymeric potting material.

5. (canceled)

6. (currently amended) The apparatus of claim 1, ~~wherein the fiber optic sensing coil comprises a first coil portion and a second coil portion,~~ wherein ~~a~~ the portion of the polymeric potting material separates the first coil portion and the second coil portion, wherein the portion of the polymeric potting material comprises the one or more of the plurality of introduced voids;

wherein the one or more of the one or more of the plurality of introduced voids compress to allow the portion of the polymeric potting material to absorb the portion of the applied force from one or more of the first coil portion and the second coil portion.

7. (currently amended) The apparatus of claim 6, wherein the one or more of the one or more of the plurality of introduced voids compress to promote the decrease of the reaction force from the portion of the polymeric potting material to the first coil portion, wherein the reaction force is generated in response to the applied force from the second coil portion.

8. (currently amended) The apparatus of claim 6, wherein the one or more of the one or more of the plurality of introduced voids compress to promote the decrease of the reaction force from the portion of the polymeric potting material to the first coil portion, wherein the reaction force is generated in response to the applied force from the first coil portion.

9. (currently amended) The apparatus of claim 6, wherein upon an expansion of the fiber optic sensing coil, the first coil portion and the second coil portion exert the applied force on the portion of the polymeric potting material;

wherein the one or more of the one or more of the plurality of introduced voids compress to promote a decrease of strain in the first coil portion and the second coil portion due to contact with the portion of the polymeric potting material.

10. (currently amended) The apparatus of claim 6, wherein the first coil portion and the second coil portion comprise adjacent layers of the fiber optic sensing coil, wherein the first coil portion and the second coil portion are separated by a distance;

wherein the one or more of the plurality of introduced voids in the portion of the polymeric potting material comprise a diameter that is smaller than the distance.

11. (previously presented) The apparatus of claim 1, wherein a distribution of the plurality of introduced voids is substantially uniform within the polymeric potting material.

12. (previously presented) The apparatus of claim 1, wherein a fiber optic gyroscope comprises the fiber optic sensing coil, wherein the fiber optic sensing coil senses a rate of rotation for the fiber optic gyroscope.

13. (currently amended) The apparatus of claim 12, wherein the compression of the one or more of the one or more of the plurality of introduced voids promotes a decrease in a rotation sensing bias error of the fiber optic gyroscope through promotion of a decrease in a pressure exerted on the fiber optic sensing coil by the polymeric potting material.

14. (previously presented) The apparatus of claim 1, wherein the plurality of introduced voids comprise a plurality of hollow elastomeric microspheres.

15. (currently amended) An apparatus, comprising:

a fiber optic sensing coil of a fiber optic gyroscope, wherein the fiber optic sensing coil comprises a first coil portion and a second coil portion, wherein the first coil portion is adjacent to the second coil portion; and

a potting material that encapsulates the fiber optic sensing coil, wherein the potting material comprises a plurality of introduced voids that promote an increase in compressibility of the polymeric potting material, wherein one or more of the plurality of introduced voids are located between the first coil portion and the second coil portion;

wherein upon contact between the fiber optic sensing coil and the potting material, one or more of the one or more of the plurality of introduced voids compress to promote a decrease in a strain on the fiber optic sensing coil, wherein the decrease in the strain on the fiber optic sensing coil promotes a decrease in a bias error of the fiber optic sensing coil.

16. (currently amended) The apparatus of claim 15, wherein the fiber optic sensing coil comprises one or more optical fibers wound about a spool in a plurality of layers, wherein the first coil portion comprises a first layer of the plurality of layers, wherein the second coil portion comprises ~~a first layer and~~ a second layer of the plurality of layers; wherein a portion of the potting material comprises a buffer between the first layer and the second layer;

wherein the portion of the potting material comprises the one or more of the plurality of introduced voids, wherein the one or more of the plurality of introduced voids promote a decrease in pressure exerted between the first layer and the second layer.

17. (currently amended) A method, comprising the steps of:

encapsulating a fiber optic sensing coil within a polymeric potting material that comprises a plurality of introduced voids that promote an increase in compressibility of the polymeric potting material to absorb a portion of an applied force, wherein the fiber optic sensing coil comprises a first coil portion and a second coil portion, wherein the first coil portion is adjacent to the second coil portion, wherein one or more of the plurality of introduced voids are located between the first coil portion and the second coil portion; and

accommodating compression of one or more of the one or more of the plurality of introduced voids in response to the applied force to promote a decrease in a reaction force from the polymeric potting material to the fiber optic sensing coil.

18. (currently amended) The method of claim 17, wherein the step of encapsulating the fiber optic sensing coil within the polymeric potting material that comprises the plurality of introduced voids that promote the increase in compressibility of the polymeric potting material to absorb the portion of the applied force comprises the steps of:

applying the polymeric potting material to a sensor fiber contemporaneously with winding the sensor fiber into the fiber optic sensing coil; and

buffering ~~a~~ the first coil portion from ~~an adjacent~~ the second coil portion ~~of the fiber optic sensing coil~~ with a portion of the polymeric potting material that comprises the one or more of the plurality of introduced voids.

19. (currently amended) The method of claim 18, wherein upon an expansion of the fiber optic sensing coil, one or more of the first coil portion and the second coil portion exert the applied force on the portion of the polymeric potting material, wherein the step of buffering the first coil portion from the ~~adjacent~~ second coil portion ~~of the fiber optic sensing coil~~ with the portion of the polymeric potting material that comprises the one or more of the plurality of introduced voids comprises the step of:

promoting a decrease of strain in one or more of the first coil portion and the second coil portion due to contact with the portion of the polymeric potting material.

20. (previously presented) The method of claim 18, further comprising the steps of:

employing the fiber optic sensing coil as a rate of rotation sensor in a fiber optic gyroscope; and

promoting a decrease in a rotation sensing bias error of the fiber optic gyroscope by promoting a decrease in a pressure exerted on the fiber optic sensing coil by the polymeric potting material.

21. (previously presented) The method of claim 17, wherein the step of encapsulating the fiber optic sensing coil within the polymeric potting material that comprises the plurality of introduced voids that promote the increase in compressibility of the polymeric potting material to absorb the portion of the applied force comprises the steps of:

applying the polymeric potting material to one or more support faces of a spool;

winding a sensor fiber around the spool to generate the fiber optic sensing coil; and

buffering a coil portion of the fiber optic sensing coil from one or more of the one or more support faces of the spool with a portion of the polymeric potting material that comprises one or more of the plurality of introduced voids.

22. (currently amended) The method of claim 17, wherein the step of accommodating compression of the one or more of the one or more of the plurality of introduced voids in response to the applied force to promote the decrease in the reaction force from the polymeric potting material to the fiber optic sensing coil comprises the step of:

promoting a decrease of strain in the fiber optic sensing coil due to contact with the polymeric potting material.

23. (currently amended) The apparatus of claim 1, wherein the plurality of introduced voids comprise a plurality of hollow elastomeric microballoons, wherein the plurality of hollow elastomeric microballoons comprise thin polymer walls that encapsulate a gas to allow for compression of the plurality of hollow elastomeric microballoons.

24. (currently amended) The apparatus of claim 23, wherein the thin polymer walls of the plurality of hollow elastomeric microballoons preserve a volume within the polymeric potting material;

wherein upon the introduction of the applied force to the portion of the polymeric potting material, the thin polymer walls of the plurality of hollow elastomeric microballoons compress to reduce the volume of the plurality of hollow elastomeric microballoons and absorb a portion of the applied force.

25. (currently amended) The apparatus of claim 23, wherein a coupling agent serves to adhere the thin polymer walls of the plurality of hollow elastomeric microballoons ~~microspheres~~ with a resin of the polymeric potting material.

26. (previously presented) The apparatus of claim 1, wherein the fiber optic sensing coil comprises a plurality of layers of a fiber optic cable wound about a spool;

wherein the polymeric potting material with the plurality of introduced voids holds together the plurality of layers of the fiber optic sensing coil as a wound unit.

27. (previously presented) The apparatus of claim 26, wherein the polymeric potting material holds a position of a first layer of the plurality layers relative to an adjacent layer of the plurality layers in the wound unit;

wherein the plurality of introduced voids within the polymeric potting material serve to promote compressibility of the polymeric potting material that holds the position of the first layer relative to the adjacent layer.

28. (currently amended) The apparatus of claim 15, wherein the plurality of introduced voids comprise a plurality of hollow elastomeric microballoons, wherein the plurality of hollow elastomeric microballoons comprise thin polymer walls that encapsulate a gas to allow for compression of the plurality of hollow elastomeric microballoons.

29. (previously presented) The apparatus of claim 15, wherein the fiber optic sensing coil comprises a plurality of layers of a fiber optic cable wound about a spool;

wherein the polymeric potting material with the plurality of introduced voids holds together the plurality layers of the fiber optic sensing coil as a wound unit;

wherein the polymeric potting material holds a position of a first layer of the plurality layers relative to an adjacent layer of the plurality layers in the wound unit;

wherein the plurality of introduced voids within the polymeric potting material serve to promote compressibility of the polymeric potting material that holds the position of the first layer relative to the adjacent layer.

30. (currently amended) The method of claim 17, wherein the plurality of introduced voids comprise a plurality of hollow elastomeric microballoons, wherein the plurality of hollow elastomeric microballoons comprise thin polymer walls that encapsulate a gas to allow for compression of the plurality of hollow elastomeric microballoons;

wherein the step of encapsulating the fiber optic sensing coil within the polymeric potting material that comprises the plurality of introduced voids that promote the increase in compressibility of the polymeric potting material to absorb the portion of the applied force comprises the steps of:

mixing the plurality of hollow elastomeric microballoons into a resin of the polymeric potting material to create the polymeric potting material with the plurality of introduced voids; and

potting substantially all of the fiber optic sensing coil within the polymeric potting material to hold the fiber optic sensing coil as a wound unit.

31. (currently amended) A method, comprising the steps of:

winding a fiber optic cable about a spool to form a fiber optic sensing coil that comprises a plurality of layers of the fiber optic cable, wherein the plurality of layers of the fiber optic sensing coil comprise a first layer and a second layer;

encapsulating the fiber optic sensing coil within a polymeric potting material that comprises a plurality of introduced voids that promote an increase in compressibility of the polymeric potting material, wherein one or more of the plurality of introduced voids are located between the first layer and the second layer; and

employing the polymeric potting material with the plurality of introduced voids to hold together the plurality layers of the fiber optic sensing coil as a wound unit.

32. (currently amended) The method of claim 31, wherein the plurality of introduced voids comprise a plurality of hollow elastomeric microballoons, wherein the plurality of hollow elastomeric microballoons comprise thin polymer walls that encapsulate a gas to allow for compression of the plurality of hollow elastomeric microballoons;

wherein the step of encapsulating the fiber optic sensing coil within the polymeric potting material that comprises the plurality of introduced voids that promote the increase in compressibility of the polymeric potting material comprises the steps of:

mixing the plurality of hollow elastomeric microballoons into a resin of the polymeric potting material to create the polymeric potting material with the plurality of introduced voids; and

potting all or substantially all of the fiber optic sensing coil within the polymeric potting material to hold the fiber optic sensing coil as the wound unit.

33. (previously presented) The apparatus of claim 1, wherein the polymeric potting material comprises:

one or more naturally occurring voids; and

the plurality of introduced voids;

wherein the plurality of introduced voids serve to fill a controlled volume percentage of the polymeric potting material.

34. (previously presented) The apparatus of claim 33, wherein the one or more naturally occurring voids are inherent in the polymeric potting material and the plurality of introduced voids are intentionally added into the polymeric potting material;

wherein the controlled volume percentage comprises five to twenty-five percent of the polymeric potting material.

35. (previously presented) The apparatus of claim 15, wherein the polymeric potting material comprises:

one or more naturally occurring voids; and

the plurality of introduced voids;

wherein the plurality of introduced voids serve to fill a controlled volume percentage of the polymeric potting material.

36. (previously presented) The apparatus of claim 35, wherein the one or more naturally occurring voids are inherent in the polymeric potting material and the plurality of introduced voids are intentionally added into the polymeric potting material;

wherein the controlled volume percentage comprises five to twenty-five percent of the polymeric potting material.

37. (previously presented) The method of claim 17, wherein the polymeric potting material comprises:

one or more naturally occurring voids; and

the plurality of introduced voids;

wherein the plurality of introduced voids serve to fill a controlled volume percentage of the polymeric potting material.

38. (previously presented) The method of claim 37, wherein the one or more naturally occurring voids are inherent in the polymeric potting material and the plurality of introduced voids are intentionally added into the polymeric potting material;

wherein the controlled volume percentage comprises five to twenty-five percent of the polymeric potting material.

39. (previously presented) The method of claim 31, wherein the polymeric potting material comprises:

one or more naturally occurring voids; and

the plurality of introduced voids;

wherein the plurality of introduced voids serve to fill a controlled volume percentage of the polymeric potting material.

40. (previously presented) The method of claim 39, wherein the one or more naturally occurring voids are inherent in the polymeric potting material and the plurality of introduced voids are intentionally added into the polymeric potting material;

wherein the controlled volume percentage comprises five to twenty-five percent of the polymeric potting material.

41. (new) The apparatus of claim 1, wherein the first coil portion comprises a first layer of the fiber optic sensing coil, wherein the second coil portion comprises a second layer of the fiber optic sensing coil;

wherein the one or more of the plurality of introduced voids are located between the first layer and the second layer.

42. (new) The apparatus of claim 1, wherein the fiber optic sensing coil comprises a layer of a plurality of optical fiber windings, wherein the first coil portion comprises a first optical fiber winding of the plurality of optical fiber windings, wherein the second coil portion comprises a second optical fiber winding of the plurality of optical fiber windings;

wherein the one or more of the plurality of introduced voids are located between the first winding and the second winding.